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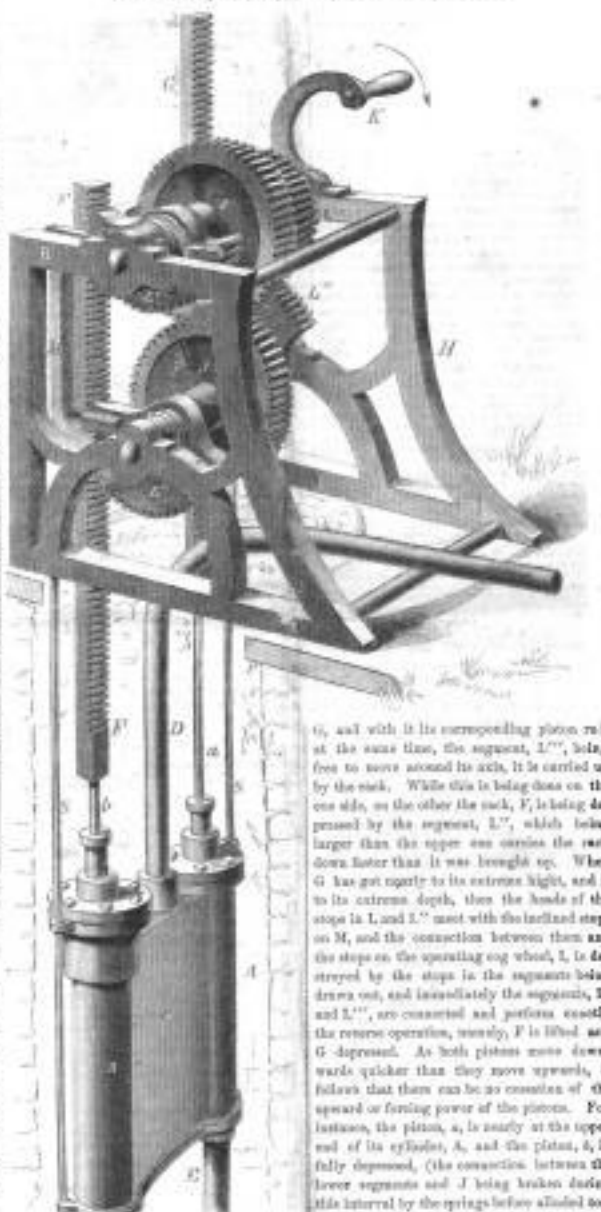
Iron Pyrites.

We have so very many specimens of this ore sent to our office with the request that we will tell the senders what it is, (many of them mistaking it for gold,) that we cannot do better than to explain the peculiarities of it, so that any person finding it may know its value, which is, comparatively speaking, nothing. It has a yellow golden appearance, due to the sulphur which it contains, and sometimes the small amount of copper present. It always occurs in a crystalline form, as cubes or double pyramids, and when cut with a knife it will be found hard, and will only chip off in one direction—that parallel to the faces of the crystal; it is very brittle, and breaks unevenly, leaving a shell-formed fracture; if it is heated, it smells strongly of sulphur, and is not at all malleable. All these characteristics show at once that it is not gold; and we would advise all those who find anything which they think is the precious metal to try these simple experiments, and if it answers the above description they need not trouble themselves any further about it. These hints are the more necessary, as it is a very common mineral, and often deceives the unwary.

Improved Force and Lift Pump.

The improvements which are to be found in this pump are intended to supply a constant and equal stream of water in every position of the pistons, and this is effected by giving the pistons a quicker motion downward than when moving upward. The engraving represents the pump in the well with the mechanism by which it is worked on the top.

A and B are two pump cylinders connected by a water passage, C, and having pistons provided with valves opening upward. The water being drawn into A through the induction pipe, E, is passed through a small opening in the top of A into the water passage, C, and from that through another opening at the bottom into B, from which it passes to the ejection or delivery pipe, D. Each of the piston rods, a and b, has a rack, F and G, attached to it. On the top of the well is placed a frame, H, having two axles or shafts working one below the other, bearing upon it, and these carry each of them a permanent cog wheel, I and J. A handle, K, is fixed to the top axle, by which the pump is operated. The upper axle also carries two segment wheels, L and L′, which are free to move around it, and each of these has a small stop or place passing through it, kept projecting a little beyond the inner surface of L by the springs, *f f*′. The cog wheel, I, gears into J, which has also a stop, *j*, pressed by an inclined plane, (which forms a stop to prevent the piston falling by its gravity,) and small space on its surface; and the lower arbor being placed a little more distant from the racks into



SUTTON'S FORCE AND LIFT PUMP.

two segments, L″ and L‴, of larger radius than the upper ones; in other respects they are exactly similar. Upon the frame, H, are placed four inclined stops in such a position as to meet the back of the stops, *i*, and draw them out by their heads connected with the springs. Two of these are connected together as seen at M.

The operation of the machine is as follows: When the handle, K, is rotated in the direction shown by the arrow, the cog wheels, I and J, are turned, and by means of the stop on I, and *j* on I, the segment L is turned round, simultaneously elevating the rack, G, and with it its corresponding piston rod, at the same time, the segment, L‴, being free to move around its axis, it is carried up by the rack. While this is being done on the one side, on the other the rack, F, is being depressed by the segment, L″, which being larger than the upper one carries the rack down faster than it was brought up. When G has got nearly to its extreme hight, and F to its extreme depth, then the heads of the stops in L and L″ meet with the inclined stops on M, and the connection between them and the stops on the operating cog wheel, I, is destroyed by the stops in the segments being drawn out, and immediately the segments, L′ and L‴, are connected and perform exactly the reverse operation, namely, F is lifted and G depressed. As both pistons move downwards quicker than they move upwards, it follows that there can be no cessation of the upward or forcing power of the pistons. For instance, the piston, a, is nearly at the upper end of its cylinder, A, and the piston, *b*, is fully depressed, (the connection between the lower segments and J being broken during this interval by the springs before alluded to,) and before piston a reaches its extreme point, the piston *b* will ascend so that there will always be a forcing power. In consequence of this, there is no clatter of the valves, as the water never falls back on them, but is continually being drawn and forced forward. This pump is especially intended for mining purposes, where a large quantity of water is to be raised, or in any situation where it is desirable to raise water from a great depth or to a great hight. The pump may be suspended from the frame at any desirable depth by the rods, N. It requires no air or vacuum chamber, as the stream is constant.

This pump is the invention of Noah Sutton, 163 Chatham street, New York, who will be happy to furnish any further information. It was patented Nov. 3, 1857.

Electric Telegraphing by Steam.

The London *Times* describes a method for sending telegraph messages by steam power. All the telegraphs in use are operated by hand, either by keys like those of the piano, as in the House telegraph, or by one key, as in the Morse telegraph. The change proposed to be effected over the common slow method is stated to be a recent invention of M. Bagge, of London, and is, in substance, described by the *Times* as follows:—

"A series of gutta percha bands, about six inches wide, and a quarter of an inch thick, are coiled on wheels or drums arranged for the purpose. These bands are studded down both sides with a single row of holes at short intervals apart. When a message is to be sent, the clerks insert in the holes small brass pins, which, according to their combinations in twos or threes, (with blank holes between,) represent certain words or letters. In this manner the message is "set up" in the bands with great rapidity, and connected with ordinary steam machinery, by which they are drawn in regular order with the utmost rapidity, between the charged poles of an electrical machine in such a manner that, during the moment of each pin's passing, it forms electrical communication between the instrument and the telegraph, and a signal is transmitted to the other end of the wire, where the spark perforates a paper and records the message. The only limit to the rapidity of the operation is the rate at which the bands can be drawn, since the electrical contact of each pin, even for the 200th part of a second, is more than sufficient to transmit a word or signal from Great Britain and register it in America."

Old friends frequently appear with new faces, and this really appears to be the case with the above described telegraph. Excepting the use of brass pins in the holes of the bands, to break and close the circuit and for setting up the messages, the invention is, in every feature, the same as the telegraph illustrated and described on page 273, Vol. III, SCIENTIFIC AMERICAN. This telegraph had holes in the bands, the same as the one described above, but no brass pins; the holes formed the connection for closing the circuit, and according to their positions they caused dots, spaces, and dashes—as in the Morse telegraph—to be recorded. It was a telegraph as capable of being operated by a steam engine as that of the above-named gentlemen, who appears to us to have dogged another person's invention.

Statue to Jenner.

A subscription is being raised in France for the purpose of erecting a statue to the memory of the celebrated Dr. Jenner, who, it will be remembered, discovered that vaccination was a preventive of the smallpox. The most eminent physicians and surgeons of Paris are on the committee, and are working hard for their noble project. We hope they may be successful, as Jenner's discovery has done more than perhaps any other for the alleviation of one of the most direful ills that flesh is heir to."

A LARGE PLANK.—A plank of redwood was exhibited at Philadelphia lately, which was about twelve feet long, six feet six inches wide, and two inches thick. It was perfectly "clear," with the exception of a small spot, not amounting to a knot, in one corner.

Patent Claims

Issued from the United States Patent Office

[Reported officially for the Scientific American.]

DRIVEN OR SHAFT PUMP.—J. G. Elliott, of Jersey City, assignor to Jonathan Shaw, of New York City: I claim the spiral shield, the studs, and fluting defined, when specifically and severally set forth.

HARROWS.—[also Rollers (assignor to himself, Saml. E. Hubbs and S. Richardson), of Leominster, Mass.: I do not claim a rotary wheel harrow, nor do I claim the application of a weight to the draft bar so as to rock on the axle of the rotary wheel harrow, and by its pressure thereon cause the revolution of the wheel harrow while it is being drawn forward, nor do I claim a rotary wheel harrow made with its toothed rim in sections, as the same is the patent numbered 12,691, of the United States Patents.

But I claim a rotary wheel harrow as made with its toothed rim in sections adjustable with reference to the axle of the wheel, as specified. In order that the characters of the wheel may be varied as set forth.

And with a wheel made adjustable as specified, I claim as applying the roller weight to its supporting arms, as to enable the weight to be adjusted nearer to or farther from the center of the wheel, and with reference to the adjustable rim as stated.

PREPARING BLADES FOR SHOT FANS.—H. P. Stimpson, assignor to himself and Lucas Farnsworth, of Boston, Mass.: I claim the described process of preparing blades for shot guns by moving and giving up the material in the manner substantially as set forth for the purpose specified.

Second, I claim the method described of securing the blades in packages, by means of beads of adhesive paste or cement, whereby the blades may be placed in the machine, and removed therefrom in bundles as set forth.

SEWING SILK.—H. Kelsey, of North Branch, in Austria, N. H., assignor to himself and Henry Dunbar, assignors to O. B. and J. C. Fuller, of New York: I do not claim a manufacture of silk twist as made by doubling and twisting together three different strands.

But I claim my improved manufacture of silk twist or sewing silk as made by doubling and twisting a single strand, and subsequently twisting it into one film or cord, as specified.

EXTENSION.

SEWING BOBBINS.—Cornelia Waterman, admr'x. of Stephen Waterman, deceased, and Isaac D. Pond, of New York City: Patented June 21, 1846.—Re-issued June 6, 1857.—Extended Jan. 10, 1864: We claim, as in the original through grooves in the inner faces of the cheeks of the blocks, as described.

Wine Manufacture and Adulteration.

Wine is the oldest of stimulating beverages, when pure, it is both healthy and nutritious. Even as far back as the time of the ante-diluvian naturalist, Noah, its very valuable qualities were tested. The two principal wine-producing countries in the world are Austria (particularly Hungary) and France. The whole quantity of wine produced yearly in all Europe is stated to be 120 millions of *eimers*, or 2,000 millions of gallons (one *eimer* being equal to twenty gallons). Of this quantity Austria and France together produce 100 million eimers, and the rest of Europe 20 millions. In good years Austria produces more than France; but generally France produces more than Austria. The consumption of wine increases every year, but its production (in a natural way) does not keep pace with the demand. It has been found by experience that thirty-three years in every century are years of failure for the wine-dresser, and only ten in every hundred are years of plenty. We may therefore imagine to what extent adulteration is carried. To illustrate this, we may mention that in the last two years less port wine has been produced in Portugal by about 80 per cent than was exported, and there was about 50 per cent more port wine consumed in England than was imported, making a total of 95 per cent spurious wine.

The most lucrative and easiest of adulterations is to convert water into wine, or to mix water with wine. Port wine is manufactured in England by adding water to very strong Cape wine, and a new fermentation is caused by yeast. Coloring substances and etheric oils are added to imitate the flavor. The same method is pursued to manufacture French and Spanish wines; raisins and currants are sometimes used, and even plums and beet-root have been discovered in spurious wines.

As the sun shines on the wicked with as much brightness as on the good, so chemistry has enabled many to adulterate, at the same time that it has taught how these adulterations may be detected; and, although, at present, we do not understand the combinations of the alcohols and ethers with essential oils, yet the time will surely come when we shall, and even to-day the experiments of the laboratory have produced from cream of tartar, sugar and fruits, seemingly good and wholesome wines. Some improvements must occasionally be made by the wine-seller, because nature does not produce every year—even on the same soil—wine of the same flavor and strength; and the wine-dealer therefore resorts to such means as will produce wine of an equable flavor. There is in Switzerland and the south of Germany a mode of wine-improving which is called "galling the wines." There is no harm in this process, as it consists in adding lime or alkalies to take off a little sourness, and in applying the white of eggs or isinglass or milk to purify it, as all these substances precipitate; but if lime or alkalies are added when the wine commences decomposing it is hurtful to the health, as chemical combinations are then formed in solutions which are unhealthy. French wines are sometimes adulterated with alum or even sulphuric acid to improve the red color. The adulterations most common are those for imparting color and flavor; the former is effected by Brazil and Campeachy wood, litmus, or citron, and the latter by nitric acetic ether.

It is a fact that, even at the present time, wines are manufactured without fresh grapes; raisins being steeped in rain or pure water, and sediments of various kinds of wines—red or white—being added to cause fermentation. These are less objectionable than the bad apples and pears and the slosp of potatoes sometimes used in making artificial wines.

Chemistry has hitherto failed to find reagents to detect such adulterations, except cider which is detected by the presence of acetic acid. The only successful detective test in the hand of an able chemist is the *quantity* of solid matter in wines, as there is a constancy in the quantity of solid matter in the various kinds of wines. It is only true of the natural unadulterated wine that it is "the milk for old age," a source of health, and the nectar to which the Greeks ascribed the power of imparting eternal youth and immortality to their gods.

I. R. BRENNAN.

[If we would discourage adulteration, we should patronize home-grown wines rather than foreign; that is, if we drink any at all. There is no doubt that America may ultimately become a great wine-growing country, if encouragement is given to her wine-growers, and as illustrations of this assertion, we need only mention California and Ohio, two States in which first class wines have already been produced. Next week we shall have something to say about home adulterations of this beverage.

Curing Back-lash in Flouring Mills.

MESSRS. EDITORS—One of the greatest difficulties in the practical working of stones flouring mills is what is termed "back-lashing," or in other words, the mill-stones, by their momentum, are carried faster than the driving gear, while the engine passes its centers, and being overtaken again, a jar is produced, also a strain on the machinery, which prevents the proper grinding of the grain, besides causing serious damage to the machinery. Many contrivances have been introduced to obviate this, such as double cogions, springs, &c., but without much success. There is, however, a way of avoiding it entirely, and of securing a motion as uniform as can be desired. The principle is known in theory to all good millwrights and engineers, but in nine cases out of ten they fail to bring it out in practice. All that is necessary, is to have the fly-wheel sufficiently large and heavy, that its momentum shall exceed that of all the stones combined. No allowance should be made for the resistance of the grain under the stones, as it will sometimes happen that the feed may be shut off by accident, and the stones, being relieved from that resistance, their momentum will increase, and breakage of machinery result. I am operating a mill which is so nicely calculated in this respect that when supplied with the usual feed, a very uniform motion is obtained; but it has happened on two occasions that the supply of grain to the stones was interrupted by straws, which produced such severe back-lashing that our main driving-shaft was broken in both instances. The momentum of the fly-wheel should exceed that of the stones combined, when running light, by at least one-fifth. For this reason, engines for flouring mills should be of short stroke, to make a greater number of revolutions per minute. This will enable millers to get up the required momentum in the fly-wheel without having it inconveniently large, and it will avoid the necessity of giving too much velocity to the pistes.

H.

Magnetic Variations.

MESSRS. EDITORS—I saw in a late number of your valuable paper an article headed "Magnetic Variations," from which I infer that Mr. Samuel H. Jack, of Maryland, was somewhat surprised to find, that from actual observation, the magnetic variation at his place differed materially from that given in Mr. Loomis' "Magnetic Chart of the United States."

Now, I do not know how perfect a chart Mr. Loomis may have been able to make of the magnetic variations of the United States, but fifteen years' experience has taught me that there is absolutely very little dependence to be placed upon the magnetic needle. I have no confidence in any chart of to-day that pretends to give me the magnetic variation on the same meridian to-morrow, next week, or next year. Such are the variety of causes of magnetic variation that we are not certain of its remaining the same, even for an hour at a time, on the same meridian, much less if the needle be transferred to another meridian, no more than a mile from the first. Heat and cold, the different electrical states of the atmosphere, and the different ores in which the earth abounds, all have their effect upon a good magnetic needle. Nor do we often find two needles that will indicate precisely the same variation at the same time and on the same meridian. I have two excellent needles, and they differ to the amount of 20'.

From a series of observations which I have been making at this place since the 1st of May, 1857, I find that the average variation of the same needle, at 7 o'clock A. M., has been 3° 39' E.; at 12 M., 3° 46' E., and at 6 P. M., 3° 41' E. I find also that in the whole number of days on which observations were made, there were not more than one-fourth in which the variation stood the same all day. In some instances the variation increased 20' between morning and noon.

Such has been my experience, and such, I think, will be every man's that puts the matter to the same test. It is easily seen, therefore, how little dependence is to be placed upon the needle in making any very important survey. C. S. WOODARD.

Michigan City, Ind., Jan. 13, 1858.

German Newspapers.

MESSRS. EDITORS—Your paper of January 16th contained an article stating that "there are ten times as many newspapers printed in the German language in the United States as there are in Germany." In reply to, and refutation of this, allow me to refer you to a statement translated from the Leipzig *Illustrirte Zeitung* (a paper that is, in every way, reliable,) of August 21, 1857, which says:—

"In 1856, there were regularly published in Germany 1,206 newspapers devoted to politics and news, 191 to theology, 45 to philology, 69 to law, 69 to general literature, 85 to history, 80 to medicine, 78 to natural sciences, 120 to agriculture, 120 to commerce and mechanics, 99 to modern literature, 21 for children, and 111 of miscellaneous contents."

This shows that there are 2,961 newspapers printed in Germany, while, according to a recent statement of one of the western German papers, the whole number of German papers, periodicals, &c., published in the United States is 138. In addition to the above figures, two circumstances should be considered: In the first place, the heavy stamp-duty demanded by the government in Germany on all periodical publications, makes them very expensive, in comparison to the same in this country, where they cost nothing but the actual expense of printing, &c.; and in the second place, a very large proportion of the population in Germany consists of people whose earnings are so small that the expense of a newspaper would be a large item; and it is, therefore, usual there for two or three, and even as many as six or eight families, to club together, and take one newspaper or other periodical between them, reading it by turns, according to arrangement made; while many are dependent for their news on the papers found at the confectioners, beer-houses, or public reading-rooms. A. GERMAN.

Pittsburg, Pa., February, 1858.

[The item to which our correspondent refers was taken from the miscellaneous columns of one of our leading daily papers. We do not know where the responsibility of the miscalculation rests, but we are pleased to receive and publish the facts as set forth in the above letter. They are, no doubt, correct.

A Cup of Bitters.

Thoughtless people would have the world made up of sweets; they would expunge bitter substances as useless. When, however, we look into nature's laboratory, we see that bitters have not been made in vain. The consumption of bitter substances by the human family is so great that it can only be compared to the demand for sweets. Bitter substances, like sweets, can be extracted from a great variety of plants growing in different parts of the earth. The purest bitter principle is yielded by the quassia tree, so called after a negro named Quassi, who used it with remarkable success in curing a malignant fever which prevailed at Surinam. Nearly all the bitter plants are called *febrifuge*, from their power to cure fever. It is not, however, in ill health that bitters are solely used, but in ordinary beverages, which are not absolutely essential to support life. The principal bitter used in England is well-known to be derived from the hop plant; in Germany it is from wormwood; in Italy it is from absinth. In the latter country we see men smoking their segars, and if leisurely converging they drink "bottled absinth," which, to an English palate, is as bitter as to be perfectly nauseous. In the Levant they eat a sort of gourd, or bitter cucumber. Some of the Biblical interpreters think that this is the plant spoken of in the Second Book of Kings, Chap. IV, ver. 39-41, on tasting which for the first time, the people exclaimed to Elisha "there is death in the pot," but on being mixed with meal there was "no harm in it." In Scotland they dry and chew the roots of the bitter vetch; these roots are also put into their whiskey. The bitter vetch is reputed to have the power of allaying hunger and thirst for a lengthened period; but in London the "evening topers" drink bitters in the morning to stimulate the appetite. There are a great many other bitter plants used in various parts of the world. In Sweden the marsh sedum, or wild rosemary, takes the place of the hop; and in North America they have a plant called Labrador tea, which affords a more bitter infusion than the China tea used in England. Among the other numerous bitters we must not forget the chamomile, the bitter of which is said to be the only remedy for nightmare. Horseradish, turnip-tops, and many other things are included among the bitter food which we eat and relish. It is not a little remarkable that young people have a dislike to anything that is bitter, while elderly persons generally prefer bitter things. This is just as it should be; for as life advances, our spiritual self would seem to require a sort of grease to the wheel—a resin to the bow; and this is well supplied by bitters. SCIENCE PENNY.

Calcareous Rocks.

These are composed of carbonate of lime, and are called by various names according to their state of aggregation. In marbles and Iceland spar, it occurs in crystals: in lias limestone, it is compact; and in chalk almost pulverulent. The colors of calcareous rocks are even more various than their structures. Iceland spar is perfectly transparent; pure marble and chalk are white, whilst other varieties of this substance possess colors differing according to the nature of the organic or inorganic substances by which they are stained.

New Inventions.

Circle of the Scientific Press.

This interesting society has held its weekly meetings in Paris with great regularity, and has devoted much of its time to the discussion of the plan for tunnelling the Straits of Dover, which it has decided can be done. Photography has also received a share of its attention; and some highly interesting papers on the heating qualities of coke when mixed with anthracite, have been read by M. Tardieu, to which we shall call more especial attention on a future occasion.

Psylleography.

This is the name given to a new branch of art recently brought to great perfection by an Italian named Muratori, in Paris. It consists in simply cutting out sheets of black paper in such a way as to make it into a picture, which has all the finish of an engraving. The production of landscapes was first attempted by this method by a German named Schmidt; but Muratori is stated to produce views equal to those of the best artists employing brush and pencil.

Machines Wanted.

First, A machine capable of carding and spinning wool, for the use of a family of moderate size, to be run by means of a crank turned by hand, or by any other cheap power, and of such size as would be convenient for a farmer to have in his house. Second, A machine to do the knitting of a family.

W. W. O.

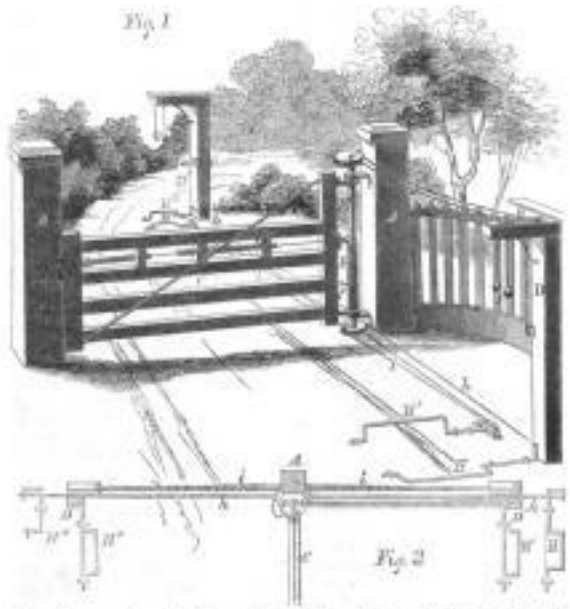
[There are knitting machines in use of the character referred to by our correspondent, but none for carding and spinning, so far as we know. We have no doubt but such can easily be made, and would be of great advantage to many families. We solicit inventors to devote considerable attention to the invention of neat portable machines, whereby every farmer's family may be enabled to make their own cloth—carding, spinning, and weaving—in a superior manner to the clumsy machines and processes whereby home-made fabrics are now manufactured.—Eds.

Automatic Field Gate.

The trouble of opening gates is one of the great inconveniences experienced in riding or driving in the country, and even the carman, sitting on his cart, has a decided objection to coming down and opening the gate, that his horse and cart may pass through. Every one, more or less, has felt this trouble, and in consequence self-opening and closing gates have been invented to supply the want.

The gate shown in our engraving is one of the most recent, and possesses some novelty. Fig. 1 is a perspective view of the gate and approach, in which A represents the post, from which the gate is swung, and E the post against which it closes. C is the gate, which has a catch kept closed by the spring, G, and to open the gate it is requisite that the catch be pulled back against the spring, the tendency of which is to keep it out. The gate is hung from a bar, E, provided with a small pulley, *e*, at the bottom, and another, *e'*, on the top. Around this, and fastened by one end to it, are wound the spiral springs, F, both meeting and connected with opposite sides of the gate at *f*. D and D' are two posts, each having a latch, against which the gate shuts when opened. H H' H'' H''' are cranks in the ground, over which the wheels of the carriage pass, and their weight pressing the cranks down, the gate is operated. Suppose a carriage to be advancing to the gate from the foreground of the engraving; the wheels pass over H', and pressing it down, cause the pulley at its extremity to perform a quarter revolution; this operates the cords, *c*, which being connected with *e*, wind up the spring, F, and at the same time pulling back the catch, the gate is released, and the force of F carries it round to D'; the passage is now clear, and the carriage wheel passes over H''', the crank on which is connected by the rod, *b*, to *e*, and this turning *e* again, the catch is released, and the spring wound up in a reverse direction, and the gate flies back to the post, B. If a carriage be coming the other way, the reverse takes place, H''' as H'' being first pressed down, and the gate flies to D. Should the person wishing the gate opened be on horseback or on foot, it might be somewhat difficult to cause the foot to tread in exactly the right place, so another contrivance is added. On the top of D and D' are hoops containing small pulleys, *k*, and over these, cords, *j*, connected with *c'*, and having at their ends balls or weights, *l*, de-

SMART'S AUTOMATIC FIELD GATE.

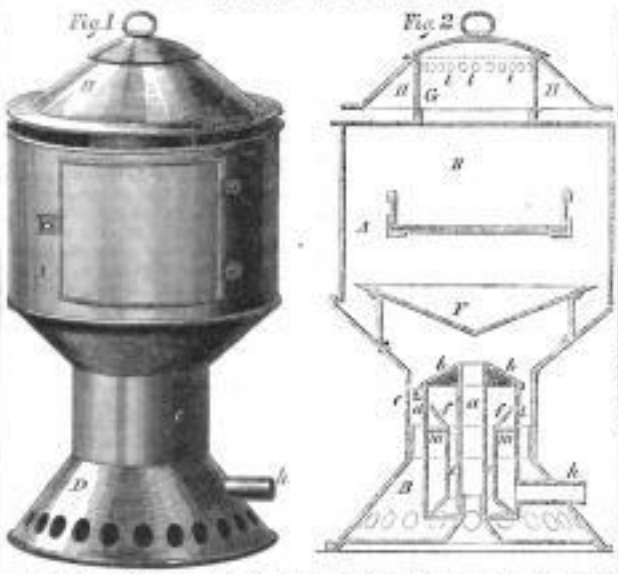


pending. A person advancing from either side of the gate, can, by pulling one of these weights, cause the gate to open, and by doing the same when through, the gate will close behind him, there being no necessity that he should dismount if on horseback.

The great novelty consists in the employment and combination of the spring and catch and rod, so that when the catch is drawn back, the spring receives at the same time sufficient power to open the gate in either direction. Fig. 2 is a plan view.

It is the invention of C. W. Smart, of Watertown, N. Y., who will give any information that may be desired. It was patented December 22, 1857.

MIHAN'S PATENT GAS STOVE.



Among the numberless applications of coal, and other gas to the comfort and use of man, there is not one superior to gas as a heater. It is as cleanly, as easily lighted, as cheap, and gives as much warmth, that any device for radiating all the heat given out in combustion must be acceptable.

The stove which is represented in our illustrations (of which Fig. 1 is a perspective view, and Fig. 2 a section,) is intended for this purpose, and its peculiar features we will now describe. In the perspective view, only the external parts are seen, which are: D, a conical shaped base, perforated with holes to admit the amount of external air necessary for the combustion of the gas; *b*, a pipe that admits the gas; A, the body of the stove, having a door, and B, a more or less closed cover. In the section, Fig. 2, it will be seen that the gas, entering at *b*, passes into the burner, E, situated in the portion, C, of the stove; after surrounding the burner, it passes through the diaphragm, *m*, and becomes regulated in its stream, and then meeting the deflecting plate, *f*, it meets with the air drawn up through *c*, and becomes perfectly mixed; this mixture is burned with an excess of air through the tube, *a*, on the wire gauze cone, *k*, extending all round, from the outer case, *d*, of the burner, E, to the central tube. By this method of combustion, all the heat is obtained and no smoke produced, and the heat, striking against the deflecting plate, F, passes all around the tray, (shown in Fig. 2,) on which anything may be baked, thus making an oven of the stove, and passing up G through the holes, *i*, and down into the room, after having done its utmost, through the space between H and A.

This gas stove is the invention of Patrick Mihan, of Boston, Mass., who will furnish further information. Patented July 7, 1857.

French Flouring Mills.

Until recently, French flouring mills were of the most rude and clumsy construction—very much like the American mills of the past century. Lately very great improvements have been made in France in such mills, and in some arrangements they are perhaps in advance of us.

M. Bordin, as stated in a foreign cotemporary, has recently erected a mill driven by a turbine wheel under a very high fall, which operates five pairs of stones and all the attendant machinery, such as separators, elevators, &c. The turbine is placed in the basement of the mill, and its main shaft extends upwards through all the floors to the top story. All the stones are driven from this shaft by direct action, and the auxiliary machines with belting. In most of the great mills in France the stones are now driven by belting; those in England are mostly driven by gearing; while in America some are driven by direct action from turbines, others by gearing, and others again by belting. We have been informed that the method of driving stones by gearing is the most expensive for first cost, but the most economical in the long run. The gearing, if well made, and the shafting well arranged, is more steady in its operation, and requires fewer repairs than belting, or direct action arrangements.

The Necrology of 1857.

The past year has taken with it many bright spirits from the fields of science, among whom may be mentioned Hugh Miller, Dr. Kane, Dr. Ure, Dr. Conybeare and Redfield, the meteorologist. General Havelock, in India, General Cavaignac, of France, and Marshal Radetsky, of Austria, are among the heroes who have fallen before the universal conqueror, while the deaths of Thomas Crawford and Christian Rauch have left gaps in the art world that will not easily be filled up. Literature has been deprived of Beranger the poet, Douglas Jerrold the satirist, Dr. Dick the Christian philosopher, Dr. Griswold the author, and Mr. Gliddon the antiquarian. Truly, the world has suffered by the extinction of so many men of genius; but we have no doubt that others will be raised up to fill their vacant places.

Clipper Ships.

This class of fast-sailing vessels which were called into popular existence by the discovery of gold in California, in order to make quick passages, have become somewhat unpopular with their owners. It is stated that very few of them pay expenses. The great number of sailors required to work them, their great original cost, and small amount of room for cargo, are greater drawbacks in a pecuniary way than all the advantages obtained from making fast voyages. All the new ships which have recently been built are of greater carrying capacity than the genuine clipper ships built four or five years ago.

Scientific American.

NEW YORK, FEBRUARY 15, 1858.

Reforms in the Patent Laws.

A telegram to the associated press of this city announces:—"The patent bills recently introduced by Messrs. Taylor, of New York, and Chaffee, of Massachusetts, and which were referred to the Committee on Patents, have been harmonized by these gentlemen, and will probably be reported to the House at an early day. The bill agreed upon proposes several important changes. It makes the Office independent, increases the fees to meet the increased expenses; creates a Board of Examiners-in-Chief, in order to secure uniformity in granting Letters Patent; gives an appeal to the Chief Commissioner, and makes his decision final; limits the time in which an interference can be made to two years, after which time it compels the parties to go into Chancery to take proof regularly in court, to test the rights of the parties; removes the restriction on foreigners, and makes all persons equal, without regard to citizenship; allows no withdrawals, no additional improvements, no disclaimers, and no caveats; it compels the attendance of witnesses as in civil suits, and authorizes magistrates in all the States to take testimony. The design of the bill is to restrain the indiscriminate issue of patents, and at the same time protect inventors and the rights of the people."

Upon a perusal of the points embraced in the above, they will strike our readers as essential and important reforms—such as have been repeatedly urged on the attention of Congress through the columns of the SCIENTIFIC AMERICAN; and were it not for the closing paragraph, which attracts our notice, we should not at this time occupy ourselves in discussing reforms in the patent laws.

We have been aware for some time past, that a patent bill, embodying a clause to restrict the Commissioner in the free performance of his duties, has been in process of cooking; and although, like the drug in the sugar-coated pill, the design does not fully appear in the brief synopsis of the bill which we publish above, yet we were assured by high authority that the bill of Mr. Taylor had this object fully in view. We do not intend to discuss, at present, in detail, the merits of this proposed bill. We prefer to wait until it is duly printed. Our particular object now is to call attention to the "design of the bill," as set forth in the above paragraph, viz., "to restrain the indiscriminate issue of patents." If we did not know, by an experience of many years, that the above paragraph contained a gross libel on the practice of the Patent Office, we might suspect that our system was little better than those existing in some European States, which allow patents for everything, "good, bad, and indifferent," without a preliminary examination. Every intelligent person who has had business with the United States Patent Office—every patent attorney—every inventor—knows (and many of them by sad experience) that a system of "indiscriminate issue" does not exist, and has not existed since 1836, at which time our patent system was thoroughly overhauled and repaired. The public may depend upon it that there is a "snake in the grass," which had better be poked with a stick before the hand is thrust in and thereby bitten.

There are a few old fogy patentees who have become rich, and wish to be made richer at public expense, whose principal business seems to be to hang about Washington during the sessions of Congress, "clique-ing" and clubbing together to carry out their own selfish ends, wholly in disregard of the rights of others. This clique constitutes a powerful "lobby," and is generally able to insinuate itself upon some verdant member of Congress, who will undertake the championship of their horrible wrongs. No other inventors ever suffered like these men—they have been harassed by litigation—pirates have robbed them; and if we could believe all they affirm of their own wrongs and sufferings, we should be impressed with the conviction that no class of Christian martyrs ever underwent equal pain and torture.

If we may believe newspaper reports, a new element has recently appeared to join hands with this suffering band of patent (not patriot) martyrs. Some Examiners, all of a sudden, have been seized with a holy horror, because Commissioner Holt has appointed from out of their number an Appeal Board of apparently sympathising, liberal men, who sometimes overrule the previous decision of the other Examiners; and these latter, therefore, are crying "mad dog," "worthless patents," &c., and are terribly affected with the horrid thought that the country will be deluged with these useless parchments. We wish not to be misunderstood on this point. We have confidence in most of the Examiners now in the Patent Office; they are worthy men, and no doubt endeavor to exercise a proper judgment in all cases brought to their examination. It is nevertheless true, however, that some of the older Examiners (the Office is nearly clear of them now) have suffered their views to contract very much in judging questions of novelty, and there can be no doubt whatever that many cases are wrongfully rejected: hence the necessity of a liberal Appeal Board, which, in the language of the Commissioner, will "kindly and uncloudy lift from the invention its minutest patentable features."

The two elements combined in this scheme to limit the functions of the Commissioner, by depriving him of the power to select a Board favorable to the harmonious working of such a system as, in his judgment, will best subserve the interests of which he is the appointed guardian, will work no ultimate good; and we hope that Congress will not lend its authority to cripple or in any manner interfere with its judicious development.

African Discoveries.

In looking at a map of the African continent one is immediately struck with its imperfections, that is to say, so few places are marked upon it, and all the central portion is described as an "unexplored region," and in casting the eye over it, the word "desert" is frequently seen. From this, and many other causes, mostly traditional, the world has been in the habit of regarding the central portion of Africa as a gigantic waste of sand, on which a tropic sun was ever shining, and where the only breeze that ever wafted over its plains was the deadly simoon or sirocco. Gradually, but slowly, these ideas have been losing ground, and the reading and inquiring portion of the community here and in Great Britain have been anxious to know more about this portion of our globe, of which their pre-conceived notions were so very crude.

Mungo Park, James Bruce, and Gordon Cumming have all told such marvelous tales of rich plains and verdant hills, rivers and inland seas, that people have put them down as, at least, romancers; but at last the time has come when all their accounts of beauty and fertility are corroborated, and the idea of African deserts has received, in a great measure, its death-blow, from two gentlemen whose travels are now before the world: one of these, Dr. Livingstone, a missionary, and the other Dr. Barth, a medical man, who was sent out, we believe, by the British government, to make an official report of his discoveries and researches. The former gentleman has chiefly explored Western Africa, and has discovered a vast inland sea (Lake Ngami). Generally he found the land rich and fertile, and the inhabitants hospitable, but not too much given to the arts of peace. In nearly the whole district through which, for about ten years, he has been traveling, the inhabitants were pagans. Dr. Livingstone's book contains much valuable and interesting information, and is full of exciting anecdotes, and pleasant details of the manners and customs of the tribes who entertained him; but it is to Dr. Barth's travels in North and Central Africa that we must turn for practical information. He tells us that there is uninterrupted water communication from the Bay of Biafra to the great Lake Tsad, (or, as it is spelt on the maps, Tchad,) by means of the rivers Binue and Kwara. The banks of both of these rivers are lined with villages inhabited by peaceful and industrious natives, who raise cotton, tobacco, and negro corn; there is some attempt at ornament in their clay-built houses, and altogether they are in a far more advanced state of civilization than is generally supposed. The country is extremely beautiful, fertile, and well-watered, and in every way suited to the production of those plants which require a warm sun. The general description of all travelers has been: "Beautiful plains, well-wooded slopes, park-like scenery," and other expressions of similar import. As a climate, Africa is proved to be rich, not barren; fertile, not sterile; and all that she wants to develop her resources is the improving hand of the white man, to teach her present owners the arts of civilization.

We should not be surprised if, in less than fifty years, steamboats were plying on her rivers, and tracks were being laid for railways, for there is little doubt that now her resources have been made known, it will not be long before some enterprising Yankee goes off to find applications for them; and no matter who it may be, we shall wish every pioneer, from whencesoever he starts, who goes to spread civilization among the wild tribes of the desert, or more peaceful denizens of the plain, a most hearty and earnest "Success be with you!"

Special Legislation on Patents.

"The House Committee on Patents have reported a bill extending for seven years the patent of David Bruce for his type-casting machine, and a bill extending for a like term Wm. Crompton's patent for an improvement in figure or fancy power looms."

The above significant paragraph we find under the telegraphic news of our daily papers of the 5th inst. The work of the Patent Committees in Congress has evidently commenced in earnest, and although the two cases on which they have reported are not so specially obnoxious to the community at large as many cases which the Committee have under advisement, they clearly indicate the sentiments of this Committee, and their acts in these two cases foreshadow what may be expected hereafter.

We object, in toto, to the system of extending patents by special legislation as long as we have a Patent Office with a good code of laws which are ample for the protection of every inventor, and we believe the Committees in both Houses of Congress would do the public a benefit by reporting adversely on every case presented to their attention. The Patent Office is the place to go to get patents extended as well as granted, and every applicant who can show that he is entitled to protection for a period beyond the 14 years for which his patent is originally granted, can enjoy his privilege for seven years longer by complying with the statutes and conforming to the rules of the Patent Office in filing his testimony.

But the most of those, and perhaps we might in truth state that all those who are asking Congress to legislate on their patents, have either had the benefit of the seven years' extension by the Patent Office, and already enjoyed a monopoly of their invention for 21 years, or else have so failed to blind the eyes of the Commissioner by their statements at the time of asking for the extension, that he could see that they had been already well remunerated, and thus were not entitled to further protection. The public may be assured that almost every applicant's patent has passed through one or the other of these phases.

The Crompton patent—now sought to be extended—was originally patented Nov. 23, 1837, and in 1851 it was extended by the Patent Office for seven years to Edson Fessenden, as conveyor, making 21 years this patent has been in existence.

The patent on which Mr. Bruce seeks an extension was granted in November, 1842, but for some reason he failed, it seems, to get it extended by the Patent Office, and consequently it expired in November, 1857, since which period it has been *public property*. He now asks Congress to issue to him a *new* patent; for so long as the original patent has expired, it of course cannot be revived, and there is now no way in which he can get his dead patent into existence, unless Congress instructs the Commissioner of Patents to grant to Mr. Bruce a new patent.

That Congress has the power to extend patents after the patentee or assignee has had the benefit of the full protection afforded by the statutes which regulate the issue and duration of patents is a question which we do not propose to discuss at present. But it is our opinion that whenever a patent has expired and the invention thus becomes public property, our courts would not sustain the renewed patent as constitutional grounds. It seems to us to be a species of special legislation not sanctioned either by right or justice, as it takes rights from the public to which they are entitled and confers them upon an individual.

Murexid Colors.

Uric acid, when dissolved in dilute nitric acid and exposed to heat until it becomes dry, assumes a deep red appearance, and when treated with ammonia afterwards, is changed into a rich purple color, forming the "purpurate of ammonia," or murexid. It is obtained in the form of beautiful crystals, which appear of a deep red color by *transmitted*, and a green color by *reflected* light. The murexid is soluble in ether, alcohol, and water, and produces beautiful tints on various fabrics. When first discovered, some years since, its application to the coloring of silk was immediately suggested, but it was not until very lately that this could be done in such a manner as to make the color even moderately permanent; it was almost as fugitive when exposed to sunlight as the yellow stains of turmeric, which are about as fleeting as a shadow.

To fix the purpurate of ammonia color on silk, a solution of it is mixed with another of corrosive sublimate in a bath; on the silk being immersed in the liquor, it soon assumes the rich purple shade, the depth and tone of which depends on the amount of murexid and corrosive sublimate used. A weak solution produces lilac shades; strong solutions, deep purple shades. This method of fixing the murexid is stated to be a recent discovery of M. Depouilly, a practical chemist in Paris.

These purpuric colors are also applicable to wool, and have been in use for some years in Germany, where chemistry is studied more thoroughly than in any other part of the world. The process for coloring wool is different from that of silk. All the dirt and grease being first removed, the wool is handled for half an hour in a warm bath, somewhat strong, of the murexid, and then dried in the open air. After this it is put through a second bath, at a heat of 160° Fah., containing corrosive sublimate and acetate of soda, in quantities of 2 ounces of sublimate and 3 ounces of the acetate to every 2½ gallons of water. In about twenty minutes a beautiful purple color is obtained on the wool. A little oxalic acid is generally added to the first murexid bath. Cotton is colored in a strong solution of the murexid and nitrate of lead. Corrosive sublimate and the acetate of soda are also used as the fixing agents in a finishing warm bath. The color can be printed on the white ground of calicos by making up the paste in the proportions of 10 oz. of murexide and 10 oz. of nitrate of lead in 30 oz. of water—thickening with gum to the proper consistency for print-

ing. After the color is printed on the goods, they are passed quickly through a flight box, heated to 160° Fah., containing superheated gas. The colors of purpurate of ammonia has obtained are stated to be very beautiful.

All colors—those on goods, fruits and flowers—are not substantives, as some suppose, but merely the reflection of light caused by the peculiar forms of the objects which reflect them. All the colors of the rainbow are wanted by a drop of water, yet the water is colorless. It is the same with a prism of glass or rock crystal, which is transparent and white of itself. Some have supposed that a science might be built up by which the constitution of substances could be determined by their colors, but this is an impossibility. There are black and white diamonds, and the red iron assume red, yellow, and blue tints by simple exposure to different degrees of heat. The colors on goods—such as silk, cotton, and wool—are due to exceedingly minute crystals precipitated in their pores or cells by chemical affinity or electrical action.

Moonology.

A correspondent—F. M. Shelton—writing to us from Kirksville, Mo., says:—

"I find that the inhabitants of Missouri ascribe to the moon great influence, whereas the people in the New England States, as a general thing, regard it as mere superstition. For instance, throw two pieces of board upon grass, one during the light of the moon, and the other during its darkness; and at the end of six weeks the grass under the one will be dead, while that under the other will be green. Again, build two parallel pieces of fence during the light and dark of the moon; and at the end of a year, one will be found to have perceptibly settled, whereas the other will have remained as when it was built. Again, by laying two courses of shingles during the light and dark of the moon, the one course will warp, while the other will remain level. The Missourians say this is not a theory to be supported by argument, but a self-evident fact. I request you to solve the question 'Does the moon exercise any such influence upon the earth?'"

Our correspondent is correct in his views regarding the proofs for establishing the moon's influence. It is not argument, but facts, by which such a theory can be supported or overthrown. We can easily conceive how the moon's rays may exercise a chemical influence on those bodies upon which they fall, but why, after a considerable period of time, they should cause a fence to sink that was built during the light of the moon, and not affect another erected during the dark of the moon, surpasses our comprehension, and we believe that such is not the case, although it may be a belief in Missouri, and other portions of the country. If it is the light of the moon which exercises such an influence, of course both of the fences referred to should be affected, but in different proportions. That exposed the one year to the light of twelve moons should exhibit an effect one-twelfth greater than the one exposed to that of eleven moons—one more, and so on; and the same results should be exhibited with the two courses of shingles.

We believe that the moon does exercise some influence on vegetation, and other objects, but at the same time we are positive that many wrong notions are afloat regarding the actual extent of such influences. Those farmers who sow their seed, plant their potatoes, put up their fences, and shingle their houses under the direction of Mrs. Moon, are undoubtedly, deeply tinged with superstitious notions. We have seen it demonstrated in practice, that those farmers who pay no attention to the moon's periods in sowing, planting, or reaping, raise as good crops as those who are strong believers in lunar "contraptions," or the magic influence of the moon.

It is an established fact, we believe, that fowls must or fish patrifies much sooner by exposure to the moon's rays than it would if kept under cover; this is due to the chemical influence of such light. This opinion, however, is opposed to that of Arago and Dr. Lardner, in their work on popular astronomy. They admit that the reputed meat purifies sooner, but say "it is owing to its being more cooled by radiation, thus causing it to imbibe moisture, which is a source of decomposition to animal bodies."

The theory of these philosophers is undoubtedly incorrect, because they have advanced no proof regarding the exposed meat imbibing moisture, nor if it did, that this is the cause of its more rapid decomposition. Their theory is also based (and they have so stated it) upon the supposition that the moon's rays possess no chemical influence whatever, whereas we now know that Luna can take her own picture on the sensitive sheet of the photographer—thus demonstrating the chemical power of her light.

A common and popular opinion—said to be an old Indian notion—is, that when the crescent of the new moon appears in position as if a powder-horn could be hung upon it, warm weather may be expected to follow. To this belief a superstitious notion or not, it has some foundation in fact, as has been proven by many observations, and never more conclusively than during the past month of mild weather, when the dim disk of the new moon appeared as if reposing on a crescent of silver.

Natural Oil Springs.

In some localities of our country, oil is obtained like water; in one place it is found bubbling from the hill-side; in another by boring deep through hard rock; and in another, saturating the soil, like water in the marsh. Some of these oil springs were known to the aborigines before the foot of white man had pressed the leaves lying in the dark forest, and the oil itself had been used by them for medicinal purposes, such as for removing pains, by applying it outwardly. For the same purpose it is now much employed by all classes of our people; and in some sections of the country it affords the means of artificial light and lubrication.

At Tarentum, Allegheny county, Pa., a clear and beautiful oil is obtained, which is similar, in nearly every feature, to the best refined coal oils; and it is used without any refining process just as it comes from the bosom of the earth, for burning fluid and for lubricating machinery. In a sample of it sent us by Messrs. Irvin and Petersen, of the above place, there are naphthine, paraffine, and a trace of benzene, thus showing that it is of the same nature as the oils now obtained by distilling bituminous coals and shales at comparatively low temperatures. In relation to the source of this oil, those gentlemen, in their letter to us, say:—

"The borings of the numerous wells in this vicinity prove conclusively the non-existence of vast fields of coal immediately beneath the surface. A question now arises as to where our supply of oil comes from. Your remarks recently, in elucidation of this subject, (page 122) are verified by our practical experience."

Some small seams of coal are found at Tarentum by boring; also salt water at a depth of 600 feet; and, strange to relate, a vein of fresh water impregnated with carbureted hydrogen 640 feet below the salt, or 1,240 feet deep.

We have also received a letter on the same subject, but relating to a different oil conservatory, from J. W. Hoff, of Wirt Court-house, Va., in which he describes the petroleum oil sources in that neighborhood. They were first discovered by an old hunter named Stukeley, on Hughes' river, near its junction with the Little Kanawha. This oil is found at a very short distance below the surface of the ground, and extends in a horizontal bed about one mile along the river running west, and both north and south, for about fifteen miles. It lies saturating a stratum of coarse sand six feet deep, and from every space of ten square feet about ten barrels of oil may be secured. Immediately above the oil bed, there is a thin stratum of blue marl, through which the oil does not rise, and above this there are a few feet of soil. The soil and marl are removed to obtain the oil, and a puddle is then formed, by throwing water into the sand, and puddling it with a spade or hoe. It is then allowed to settle, after which the oil is found floating on the top of the water, is lifted with ladles, and afterwards barreled up and sold at prices varying from 25 to 40 cents per gallon. There is a blowing salt well in the vicinity, which also forces out considerable quantities of very pure oil daily.

The oil conservatory on Hughes' river is somewhat different in its characteristics from that at Tarentum, but the oil in both is undoubtedly the product of distillation from carbonaceous deposits by subterranean heat. There are a series of rock oil beds under the oil; at a depth of only 100 feet there is a vein of cannel coal 27 feet in thickness. Our correspondent states that in all probability this oil is of recent formation, or rather that it is being formed all the time from the subterranean seas of coal. The blowing out of large quantities of it in the salt well would go to substantiate this opinion. This region is rich in iron, coal, and other minerals, all of easy approach, and capable of being worked at a small cost. It is probable that at some future day, not very far distant, it will afford an immense field for industrial effort and enterprise.

Ancient Use of Cork.

There are some substances in the use of which we have not made much progress, partly from the fact that other materials have been discovered to supply their place, and partly from the subsequent itself possessing such palpable peculiarities that its earlier discoverers must have seen at once for what it was most applicable. This is the case with cork. The Romans used it as soles to put into their shoes, to keep their feet warm and dry; and as there were no high heels in those days, the ladies used it to make them appear tall. Camillus swam the Tiber with the aid of a cork jacket, fishermen used it as floats as their nets, and hoops to their anchors, and Pliny tells us that it was employed as stoppers to vessels of all kinds. The old Spaniards lined the walls of their houses with cork, because it kept them warm and prevented dampness; and lastly, the Egyptians manufactured coffins of it, which, being lined with a resinous composition, preserved their dead from decay. The method employed in Portugal of cutting the bark and burning the outside, is the same to-day as it was one thousand years ago; so that altogether, we cannot say that we have done very much with cork that has not been done before. It is quite time that we made a start and discovered some new uses and appliances for this cheap and plentiful material.

Recently Noticed.

THE LIFE OF DR. KANE.—The Metropolitan of the 27th inst. gives a full account of the funeral of this lamented navigator, together with the wide-spread mourning and solemn marks of respect, and the various eloquent tributes to what we would call a great character of a great man, for well and ably has Dr. Kane done his work, which now will form the fitting epilogue and dangerous position, yet with the courage of a hero, the endurance of a man, and the sympathies of a philanthropist, he lived. Truly all.

It is a book to be read, and we should like to see it in the hands of every boy with an idea, and by an idea we mean a true conception of duty, and how to perform it. It is a book to encourage every boy to be what he ought to be, and the means will have been fully and faithfully set forth in the numerous and interesting pages devoted to the narrative of past perils. It is published by Childs & Peterson, of Philadelphia. Sold by Stringer & Townsend, 222 Broadway, New York, agents.

BOOT AND SHOE DEARTION.—We have received the first number of a work called "Uniform system for Drafting Patterns, and Scale for Cutting Boot and Shoe Uppers and Soles." It is to be issued in four quarterly parts, and we understand the system is meeting with favor. We suppose it will be finished the year of H. Crosby. The Author, Wm. Upham, is publisher; his address, New York City Post Office. Mr. U.'s residence or place of business should have been given.

HUNT'S MERCHANT'S MAGAZINE.—Freeman Hunt, New York.—This magazine for February contains many excellent articles, one on "Banks or no Banks," and another on the "Profit of the Australian Diggings," by H. M. Whitney, editor of the Foreign Commercial Advertiser, together with all the financial and mercantile news of the past month.

AMERICAN INSTITUTE JOURNAL.—O. H. Dodd, Boston, Mass.—The value of the horse is never to be too highly estimated, and it should be the pleasure of every one to know how to feed him well, how to rub, and how to keep him well. This knowledge can be acquired through this periodical, which monthly gives hints to formation of the previous kind about this noble animal.

Correspondents

G. W. S., of Ga.—Our readers should now be well acquainted with our views respecting "perpetual motions"—they are delusions. It would be a useless space, and against our principles, to notice every absurd story about such machines being discovered. Such is the case to which you allude, described in the Journal of Commerce. Our great object is to present new, practical, and useful information.

T. S. G., of Md.—There are but very few buildings erected with hollow walls. Plaster may be put on hollow brick walls without lathing, but not on solid walls, unless they are very thick, because moisture passes through thin walls and causes the plaster to crack off. We prefer lathing all brick walls for plastering. We believe there is no difference in the durability of either kind of brick walls.

C. B. W., of Ohio.—The idea of constructing railroad sides hollow is not new. They have been used in Scotland for some years, but not many of our railroads in that we know. A hollow side of two-thirds the weight of a solid one is said to be equally as strong.

F. W. W., of O. W.—There are a number of good machines for cutting shoe pegs, but whose is the best we do not know.

M. Mell., of Mich.—There are numerous models in the Patent Office of chairs constructed to support the wheels at the joints of the rails, like yours; there are also other contrivances to which your invention in that line is embraced.

James Whitney will please to forward us with his Post-office address, and we will write to him in regard to his invention. We caution our correspondents to be particular on this point, as it is often difficult for us to determine how to address letters.

G. C. R., of Texas.—We have received no communication from you within the past six months, as far as we can remember.

O. H., of Cal.—You cannot get a patent for coating an article of gutta percha which has hitherto been made of wood. The substitution of one well-known material for another in the fabrication of an article, is not the legitimate subject of a patent. We cannot answer your inquiries concerning the cost of crude gutta percha, or the cost of manufactured parlor mats. The price of Wolcombster's work is $1 per number, and is sold only by subscribers. We have credited you $2 50 in full, for subscription.

C. C., of Penn.—A. Thomson, 232 Water street, this city, sells tinners' and coppersmiths' tools. Those wanting composition for articles should describe minutely the kind of article they want.

J. D., of Me.—A millpost of wrought iron 8 inches in diameter, and fitted with steel, will easily support an upright shaft with twenty tons' weight upon it. But if you would make the gudgeon six inches in diameter, it would not be so liable to rust and wear out the step-bearing, because the friction is proportionally due to the superficial unit-weight.

J. R., of Ill.—Your plan for propelling balloons by the use of high-pressure steam escaping from a pipe at the rear end of the apparatus, upon the recoil machine principle, is certainly novel, and if you make it operate, you can, no doubt, obtain a patent.

J. C., of N. Y.—You should rather seek to cultivate than eradicate your bump heard; but if you are really disturbed to destroy yourself of surplus hair, use a peculiar smell of lime, orpiment of slacked lime and half an ounce of arsenic made into a paste with water, and applied to the spot in a feeling. Let it stay on for 20 minutes, then wash it off, and apply a little sweet cream. Two or three applications will make the hair fall off for ever. You can also purchase depilatory powders in any perfumery store.

J. B., of N. Y.—It appears to us that you seem to imagine you have discovered perpetual motion. You intend to employ a hydraulic ram to pump back into a reservoir the water used to drive a wheel, and then make the same water drive the wheel continually. But how are you going to operate the ram? You mean to connect it as a kind of live animal, whereas it will take more power to make the water expended in driving the wheel, than you can obtain from it acting on the wheel. Absurdity and absurdum.

S. S. F. & Co., of Pa.—Power is weight, or pressure multiplied into velocity. The only way you can find out the power of the blow struck on the wedge by the hammer is to ascertain its velocity; this will give you the amount of the power. You have neither given us the weight of the hammer nor the speed with which it was operated.

H. P. D., of N. J.—Please open to richard at Knowlesville Lake, St. Lawrence co., N. Y.; at Lockport, N. Y.; at the Notch in the White Mountains, N. H., and at Putney, Vt. We are not acquainted with the price.

J. W. G., of Wis.—I carry is fastened to wood by a strong nail taken of glue, in the same manner that two pieces of wood are cemented together.

T. F. B., of N. Y.—Friction matches are fine stir, in bundles, from planks and blocks, by machinery, then they are tipped, by dipping them first in melted sulphur, and afterwards in a paste composed of 16 parts, by weight, of gum arabic, 9 of phosphorus, 16 of nitre, What sequil of consequence, and a little sulphuret of antimony.

D. H., of Ill.—We do not think a policeman's club made of iron would be adopted. It is much preferable to make the club of wood.

H. G., of Cal.—If you wish our opinion in regard to the probable novelty of your steam plow, you must furnish us with a sketch and description of it. We do not comprehend your plan from the written description.

W. L., of Conn.—We have seen hundreds of silver fish in a pond, the water of which passed through the

condenser of a large steam engine. If such water is supplied with plenty of oxygen from the atmosphere it may be used either by fish or flesh. For this purpose it requires to be exposed to the open air after it has passed through the condenser.

W. W. B., of Ill.—Gold pens cannot be repointed, as the heat required to solder on the new points totally destroys the elasticity of the metal forming the pen.

A. M. B., of Pa.—A "stencil cutting" is punching a hole in the shape of a letter of the alphabet or other mark through a thin sheet of metal, so that when it is laid on anything, and a brush of ink rubbed over it, the mark or letter is laid upon the material. We are not aware that there is any book published on the subject. We believe that it is done with punches, and the work finished off with files.

N. A. Paterson, of Kingston, Tenn., desires to correspond with all the harvesting machine makers in the United States. Send him your addresses, gentlemen, and he will communicate his wishes.

C. F., of La.—In another column you will find the advertisement of J. H. Lidgerwood & Co., who state that they can furnish machinery suitable for grinding sugar cane of every description. They are the proper parties for you to address concerning machinery for grinding and pressing sugar cane.

D. F. L., of Mass.—We do not think a patent can be secured for drilling holes in the stones of the lime pavement, and filling them in with earth. It is not a patentable subject, besides we think the suggestion is not new.

J. A., of Conn.—We have not at command the information you want in reference to agents of iron works in this city.

G. B., of Pa.—We have no doubt that there is no monopoly in the sword-blade manufacture, and we are surprised the press of this country could countenance the idea. It was for the purpose of bringing out such information as you have given that the paragraph was inserted.

J. & Y., of Texas.—The tracks of all railroads have the outside rail of a curve a little above the inner, to compensate for the tendency of a train to lean inward when running a curve. When the road is straight the rails are level.

J. W. B., of Mass.—Lac dissolved in alcohol will act as a tasteless cement for your "aquarium." A box well jointed, and painted inside, should be water-tight, without the use of cement. If the paint is allowed to dry perfectly, it will communicate no taste to the water.

F. W., of Mass.—The idea of stocking the ends of rails is an old one. We do not know, however, that it has ever been carried out. No patent could be obtained on your invention.

G. G. V. W., of Wis.—You cannot use a patent winnower and cleaner designed for flouring-mills in a farming mill without infringing the patent. The mere change of use, under such conditions, would not be justifiable. You can probably get such a farming mill as you want at some agricultural warehouse in Milwaukie.

L. S., of N. Y.—The oxygen of the air becomes converted into carbonic acid by combination with the carbon of the substance burned which is dissolved by the water, and a little nitrogen remains in the top of the glass, but none expands and escapes as you suppose. From your vague description we cannot tell whether the burner you mention would be patentable or not. Send us more particulars.

W. B. G., of N. Y.—In "Smee's Electro-Metallurgy," you will find information relating to the application of photography to etching on metallic plates.

D. H. M., of Mass.—You ask, "Which locomotive is the most advantageous, all other conditions being equal, one with a five foot driving wheel, or one with a six foot wheel, on a rising grade?" We reply the one with the five foot wheel. All freight locomotives are built with small wheels.

A. J. H., of D. C.—No advantage would be gained by increasing a 20-foot overshot wheel to 40 feet, the water being still admitted to the wheel at 20 feet. You have perhaps supposed that by increasing the leverage of the wheel, you thereby would gain power. Such ideas are fallacious.

D. and G., of Iowa.—You simply propose the centesimal measure which is now in use in France instead of our common duodecimal measures. We have recommended this reform in former volumes. You will find several articles on this subject in earlier volumes—the same regarding weights.

J. S., of N. Y.—The reform in weights and measures which we desire to see effected is one that shall be uniform for all nations. We think the French system is the best, and the most likely to be generally adopted.

E. J. K., of N. Y.—Liquid silex or soluble glass is the best cement known to us for mending broken articles of glass.

M. W., of Wis.—A method of coating cast iron with silver is described on page 66, Vol. 3, Sci. Am.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, February 6, 1858:—

C. W., of Pa.; G. S. C., of Ill.; P. D., of N. Y.; J. D., of Pa.; M. Van A., of N. Y.; A. B. M., of L. I.; S. R., of Tenn.; F. F. A., Jr., of Conn.; U. F., of N. Y.; H. & J. B. S. N., of Mo.; C. L. C., of N. Y.; T. S., of Conn.; H. H., of Ind.; G. B., of Md.; F. C. W., of Conn.; R. K., of Mass.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, February 6, 1858:—

J. G. B., of N. J., $30; L. J., of Mass., $30; J. L. B., of N. Y., $30; F. S., of Pa., $30; G. S. C., of Ill., $30; P. D. of N. Y., $30; J. F. K. of Ind. $30; J. W. of Conn. $30; C. D., of Pa., $30; S. E. T., of Ct., $30; J. D. of Pa. $30; S. S., of Tenn., $30; E. L. B. of Conn., $30; C. F. A., of N. H., $30; W. F. P., of Pa., $30; J. F. A., of N. Y., $30; M. K., of O., $30; C. L. C., of N. Y., $30; T. S., of Conn., $30; A. J. G., of Ind., $30; H. & J. B. S. N. of Mo., $30; N. F. A., of N. Y., $30; C. F., of N. Y. $30; G. L. D., of N. Y., $30; G. W. B., of Conn., $30; G. B., of Md., $30; H. H., of Ind., $30; J. C., of O., $30; J. A., of Ga., $30; S. H., of Vt., $30; L. H., of Pa., $100; D. & T., of Mass., $30; A. B. H., of R. I., $30; E. R., of Mass., $30; F. G. F., of N. Y., $30; G. & R., of N. Y., $30.

TO OUR SUBSCRIBERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds. The Post Office law does not allow publishers to enclose receipts in the paper.

BACK NUMBERS.—After the 1st of January, we shall commence sending the SCIENTIFIC AMERICAN to new subscribers from the time their names are received, unless the person ordering expresses a desire to receive the back numbers, in which case complete sets will be furnished from the commencement of the volume.

TERMS OF ADVERTISING.

Twenty-five cents per line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

** All advertisements must be paid for before inserting.

The laws which govern the motion of bodies are capable of many pleasing illustrations, and the example which we now give of causing rotary motion is very interesting and easily performed. Take a piece of card and cut out a little figure like that in the engraving and paste or gum it in an erect position on the inside of a watch-glass, A. Then procure a black japanned waiter, B, or a clean plate will do, and holding it in an inclined position, place the figure and watch-glass on it, and they will of course slide down. Next let fall a drop of water on the waiter, place the watch

glass on it, and again incline the waiter, and instead of the watch-glass sliding down, it will begin to revolve. It will continue to revolve with increasing velocity, obeying the inclination and position of the plane, as directed by the hand of the experimentalist. The reason of this is, in the first place, in consequence of the cohesion of the water to the two surfaces, a near force is introduced by which an unequal degree of resistance is imparted to different parts of the watch-glass in contact with the waiter, and consequently, in its effort to slide down, it revolves. Again, if the drop of water be observed, it will be seen that it undergoes a change of figure; a film of water by capillary action, is drawn to the foremost portion of the glass, while by the centrifugal force, a body of water is thrown under the hinder part of it. The effect of both these actions is to accelerate the motion, or in other words, to gradually increase the speed.

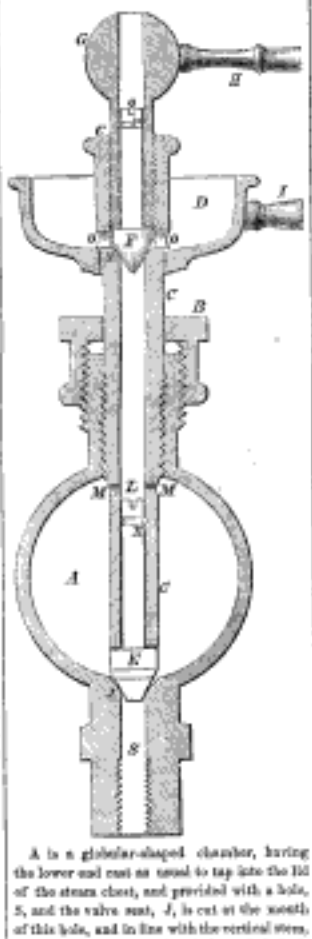
Who has not had a ride on a see-saw, aye, and who has not enjoyed it, too? Everybody of course, and will we remember in our see-sawing days how we always used to try and get some one heavier than ourselves to join us in the sport, because then we had a better ride. In those days we never inquired why, or wanted to know the cause, but even children are wiser now than they were then, and as we know that boys and girls still like a good ride on a see-saw, we will explain the reason why the lightest boy always has the biggest ride.

The see-saw is a plank laid across another, and is nothing but a lever, and when two boys of unequal weights intend to have a ride together, the plank has to be adjusted so that the lightest has the longest end, as seen in our engraving. When they commence to move up and down, they each move in an arc of a circle, the plank forming the radius and the supporter the center. The circles in which they move are drawn around them, and as the lightest boy has the longest radius, he describes an arc of a larger circle than the heavier one, and so has the best ride—that is, he goes through a greater space in the same time.

Custer's Improved Lubricator.

The necessity of having some means whereby oil or other lubricating material can be introduced into steam cylinders, steam chests, and other places where the pressure inside is much greater than the external pressure, is very obvious; and it is also easy to conceive that none of the ordinary oil cups will answer, as should one of those be placed on the cylinder, the steam would blow all the oil out of the cup instead of allowing any to pass into the cylinder. In the early history of the steam engine it was common to force oil into such places by means of a common syringe, but this was uncertain, and besides wasted a great amount of oil, and now it is usual to employ an oil cup constructed specially for this purpose.

J. D. Custer, of Norristown, Pa., has invented a lubricator which will effect this object, (and of which our engraving is a vertical section,) whose several parts we will now de-



A is a globular-shaped chamber, having the lower end cast so usual to tap into the lid of the steam chest, and provided with a hole, S, and the valve seat, J, is cut at the mouth of this hole, and in line with the vertical stem, C C C. The upper end of A has a hole in it so as to receive the vertical stem, C, and it has a screw cut outside to receive the stuffing-box, B; by this box, B, the packing can be screwed tight on the branch of A, and around, C, so as to make it steam and oil tight, the screw on C being cut so low down, that when it is raised to open E, it will not cut the packing. The cylindrical stem, C, is hollow, being wider from the top to N than from N to H, so that a seat is given to the valve, F; it has two holes, O O, just above, N, opening into the oil cup, or basin, D, through which oil can pass into the stem, and through two other oil holes, M M, into the globe, A. The valve, E, is kept in its place by a groove turned in its stem into which a slide pin is fitted at K, and at L it has a screw-driver notch cut in the top, so that it may be ground to its seat by a screw-driver reaching down when the screw, G, is removed. The valve, F, is attached to G in the same manner, having a slide pin, P, and notch, Q; it also has a handle, H. The cup, D, is riveted to the stem, C, and has a handle, I.

The operation is as follows:—When the whole is screwed into the lid of the steam chest so as not to leak, and the gum rings placed in the stuffing-box, B, then close, E, by turning the handle, I, put on the steam, and open the valve, F, by turning the handle, H, pour the oil into the cup, D, it passes through the holes, O O, shut the air valve, F one is used, and valve, F, and open the lower valve, E, the steam then fills the globe, and the oil enters the cylinder.

This is a very neat invention, and a patent was obtained for it March 24, 1857, by the inventor, who will give any further information on being addressed as above.

Improvements in the Necks of Bottles.

There have been several inventions made for more effectually securing the corks and stoppers of bottles; the one now before us is for corks only, and is of an extremely simple character. The only alteration required is in the bottle, the neck of which on the inside for about three-quarters of an inch from the mouth has to be made with an internal screw; and this, of course, has to be done at the time the bottles are manufactured. This plan would not prevent those who use large quan-

tities of bottles from adopting them, so a mixed stock of plain and screwed necked might be kept, and even mixed together without any inconvenience. The same cork that would fit the one would do for the other, and the improved screw neck bottles could be handled with greater rapidity, providing the corks were sufficiently good to stand the twist which is required to securely fix them. The advantages which this plan has over the old one are that the squeezers and mallet are dispensed with, and the certainty of the cork retaining its position when once fixed. As the screw is formed rather taper, the smallest end being downwards, every twist or half twist given to the cork reduces the diameter of it, and throws a greater pressure on the neck of the bottle. As the cork enters, an external thread is formed upon it, fitting the internal thread of the neck, so that if the cork is good, a great amount of pressure would have to be exerted before it could be forced out. Another advantage in this arrangement is, that no wire is needed to secure the cork, as it must take a spiral direction before it can be withdrawn or forced out.

A patent for fanning screws in the necks of bottles has recently been taken out at the British Patent Office, by Mr. Simpson, of Belgate, England. The means by which this is effected is by an instrument something like the tongs or shears used for forming the ordinary necks of bottles. To the ends of the jaws of these tongs are secured two pieces of metal, which are shaped to form the exterior of the neck of the bottle or vessel to be made. In the center is fitted a rod, the lower end of which passes between the jaws of the clip. The lower end of this is made conical, and formed with a thread upon it. The upper end passes through the lower part of the spring clip, and terminates in a cross handle. The melted glass is placed on the conical rod to form the neck, and the jaws of the clip brought together to form the exterior, and press the glass into the thread of the screw. The metal screw is withdrawn by means of the cross handle at the top of the rod, when the glass is cool, leaving a screw or thread formed inside of the neck of the bottle.

For medicine bottles, where the cork has to be frequently removed and replaced, this invention appears to be of the utmost value. It is one of those simple appliances which must find favor with the public, as it will save much time, waste and trouble, at a very small cost above what is now paid. As it compresses the cork much more than the ordinary bottles, it will prevent much evaporation, and so in some measure supersede glass stoppers.

We transcribe the above from an English periodical, entitled the *Illustrated Inventor*.